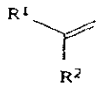
CLEAN VERSION OF AMENDED CLAIMS - OZ 0050/50063

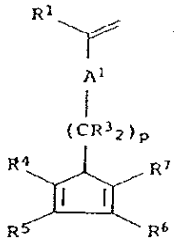
1. A supported catalyst for olefin polymerization comprising

A) as support material, a copolymer comprising at least the monomer units I, II and III,

where the monomer units I have the formula (I) and the monomer units II have the formula (II),



(I)



(II)

where the variables have the following meanings:

R^1 is hydrogen, C_1-C_4-alkyl or phenyl,

R^2 is substituted or unsubstituted aryl or branched or unbranched alkyl or alkenyl,

A^1 is directed chemical bond or a substituted or unsubstituted phenylene group,

R^3 are identical or different and are each hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl,

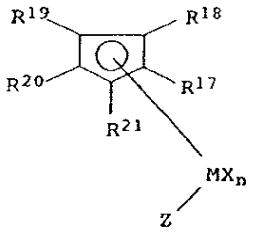
p is an integer from 0 to 8, and

R^4 to R^7 are hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl and the monomer units III have polar groups,

CLEAN VERSION OF AMENDED CLAIMS - OZ 0050/50063

and

B) at least one metallocene complex of the formula (V)



(V)

where the substituents and indices have the following meanings:

M is titanium, zirconium, hafnium, vanadium, niobium, tantalum or chromium or an element of transition group III of the Periodic Table and of the lanthanides,

X is fluorine, chlorine, bromine, iodine, hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical, $-OR^{22}$ or $-NR^{22}R^{23}$,

n is 1, 2 or 3, where n corresponds to the valence of M minus 2,

where

R^{22} and R^{23} are C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl, arylalkyl, fluoroalkyl or fluoroaryl, each having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical and

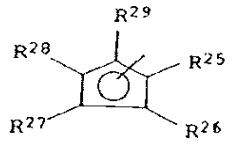
CLEAN VERSION OF AMENDED CLAIMS - OZ 0050/50063

the radicals X are identical or different,

R^{17} to R^{21} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, where two adjacent radicals may together form a saturated or unsaturated cyclic group having from 4 to 15 carbon atoms, or $Si(R^{24})_3$ where

R^{24} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl or C_6-C_{15}-aryl and

Z is as defined for X or is



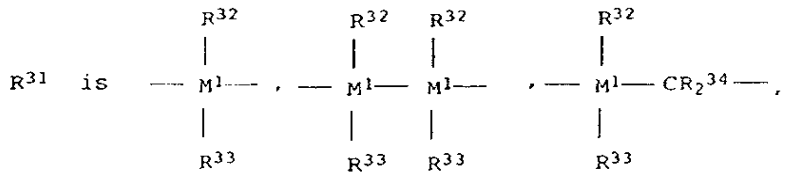
where the radicals

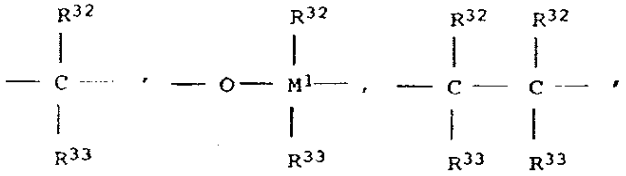
R^{25} to R^{29} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, where two adjacent radicals may together form a saturated or unsaturated cyclic group having from 4 to 15 carbon atoms, or $Si(R^{30})_3$ where

R^{30} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl or C_6-C_{15}-aryl,

or the radical R^{20} and Z together form an -R^{31}-A-group where

CLEAN VERSION OF AMENDED CLAIMS - OZ 0050/50063

R^{31} is 



= BR^{32}, = AlR^{32}, -Ge-, -Sn-, -O-, -S-, = SO,
= SO_2, = NR^{32}, = CO, = PR^{32} or = $P(O)R^{32}$,

where

R^{32}, R^{33} and R^{34} are identical or different and are each a hydrogen atom, a halogen atom, a C_1-C_{10}-alkyl group, a C_1-C_{10}-fluoroalkyl group, a C_6-C_{10}-fluoroaryl group, a C_6-C_{10}-aryl group, a C_1-C_{10}-alkoxy group, a C_2-C_{10}-alkenyl group, a C_7-C_{40}-arylalkyl group, a C_8-C_{40}-arylalkenyl group, or a C_7-C_{40}-alkylaryl group or two adjacent radicals together with the atoms connecting them form a saturated or unsaturated ring having from 4 to 15 carbon atoms, and

M^1 is silicon, germanium or tin,

A is —O—, —S—,  or ,

where

R^{35} is C_1-C_{10}-alkyl, C_6-C_{15}-aryl, C_3-C_{10}-cycloalkyl, C_7-C_{18}-alkylaryl or $Si(R^{36})_3$, where

R^{36} is hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl which may in turn bear C_1-C_4-alkyl groups as substituents or C_3-C_{10}-cycloalkyl,

CLEAN VERSION OF AMENDED CLAIMS - OZ 0050/50063

or the radicals R^{20} and R^{28} together from an -R^{31}-group

and

C) is at least one compound capable of forming metallocenium ions.

3. A supported catalyst as claimed in claim 1, wherein the copolymer A) is crosslinked via the monomer units II.

4. A supported catalyst as claimed in claim 1 which further comprises, as additional component D), one or more metal compounds which are different from C) and have the formula (X)

$$M^3 (R^{38})_r (R^{39})_s (R^{40})_t \qquad (X)$$

where

M^3 is an alkali metal, an alkaline earth metal or a metal of main group III of the Periodic Table, i.e. boron, aluminum, gallium, indium or thallium,

R^{38} is hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl or arylalkyl or alkoxy each having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical,

R^{39} and R^{40} are hydrogen, halogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl, arylalkyl or alkoxy each having from 1 to 10 carbon atoms in the alkyl part and from 6 to 20 carbon atoms in the aryl part,

r is an integer from 1 to 3

and

s and t are integers from 0 to 2, where the sum r+s+t corresponds to the

CLEAN VERSION OF AMENDED CLAIMS - OZ 0050/50063

valence of M^3.

6. A process for preparing supported catalysts as claimed in claim 1, which comprises preparing copolymers comprising the monomer units I, II and III in solution or dissolving the copolymers in a suitable solvent after they have been prepared and adding the metallocene complex B) and the compound C) capable of forming metallocenium ions to this solution.

8. A process for preparing supported catalysts as claimed in claim 6, wherein the copolymer A) is pretreated with compounds of the formula (X) prior to the addition of metallocene complex B) and compound C) capable of forming metallocenium ions.

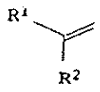
10. A process for the polymerization of olefins in the presence of a supported catalyst as claimed in claim 1.

MARKED VERSION OF AMENDED CLAIMS - OZ 0050/50063

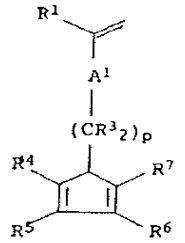
1. A supported catalyst for olefin polymerization comprising

A) as support material, a copolymer comprising at least the monomer units I, II and III,

where the monomer units I have the formula (I) and the monomer units II have the formula (II),



(I)



(II)

where the variables have the following meanings:

R^1 is hydrogen, C_1-C_4-alkyl or phenyl,

R^2 is substituted or unsubstituted aryl or branched or unbranched alkyl or alkenyl,

A^1 is directed chemical bond or a substituted or unsubstituted phenylene group,

R^3 are identical or different and are each hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl,

p is an integer from 0 to 8, and

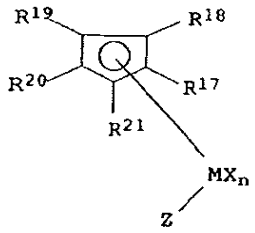
R^4 to R^7 are hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl

and the monomer units III have polar groups,

MARKED VERSION OF AMENDED CLAIMS - OZ 0050/50063

and

B) at least one metallocene complex of the formula (V)



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where the substituents and indices have the following meanings:

M is titanium, zirconium, hafnium, vanadium, niobium, tantalum or chromium or an element of transition group III of the Periodic Table and of the lanthanides,

X is fluorine, chlorine, bromine, iodine, hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical, $-OR^{22}$ or $-NR^{22}R^{23}$,

n is 1, 2 or 3, where n corresponds to the valence of M minus 2,

where

R^{22} and R^{23} are C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl, arylalkyl, fluoroalkyl or fluoroaryl, each having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical and

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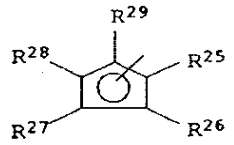
the [radixals] radicals X are identical or different,

R^{17} to R^{21} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, where two adjacent radicals may together form a saturated or unsaturated cyclic group having from 4 to 15 carbon atoms, or $Si(R^{24})_3$ where

R^{24} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl or C_6-C_{15}-aryl and

z is as defined for X or is



where the radicals

R^{25} to R^{29} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, where two adjacent radicals may together form a saturated or unsaturated cyclic group having from 4 to 15 carbon atoms, or $Si(R^{30})_3$ where

R^{30} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl or C_6-C_{15}-aryl,

or the radical R^{20} and Z together form an -R^{31}-A-group where

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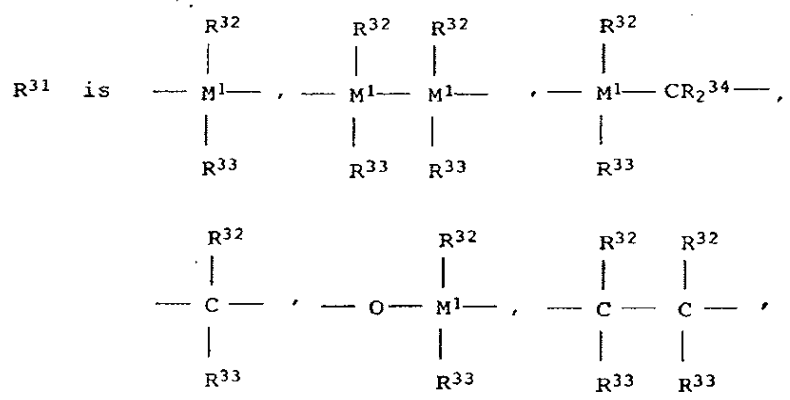
R^{31} is 

where

$= BR^{32}$, $= AlR^{32}$, -Ge-, -Sn-, -O-, -S-, = SO,
$= SO_2$, $= NR^{32}$, = CO, $= PR^{32}$ or $= P(O)R^{32}$,

R^{32}, R^{33} and R^{34} are identical or different and are each a hydrogen atom, a halogen atom, a C_1-C_{10}-alkyl group, a C_1-C_{10}-fluoroalkyl group, a C_6-C_{10}-fluoroaryl group, a C_6-C_{10}-aryl group, a C_1-C_{10}-alkoxy group, a C_2-C_{10}-alkenyl group, a C_7-C_{40}-arylalkyl group, a C_8-C_{40}-arylalkenyl group, or a C_7-C_{40}-alkylaryl group or two adjacent radicals together with the atoms connecting them form a saturated or unsaturated ring having from 4 to 15 carbon atoms, and

M^1 is silicon, germanium or tin,

A is —O—, —S—, $>NR^{35}$ or $>PR^{35}$,

where

R^{35} is C_1-C_{10}-alkyl, C_6-C_{15}-aryl, C_3-C_{10}-cycloalkyl, C_7-C_{18}-alkylaryl or $Si(R^{36})_3$, where

R^{36} is hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl which may in turn bear C_1-C_4-alkyl groups as substituents or C_3-C_{10}-cycloalkyl,

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or the radicals R^{20} and R^{28} together from an -R^{31}-group

and

C) is at least one compound capable of forming metallocenium ions.

3. A supported catalyst as claimed in claim 1 [or 2], wherein the copolymer A) is crosslinked via the monomer units II.

4. A supported catalyst as claimed in claim 1 [any of claims 1 to 3] which further comprises, as additional component D), one or more metal compounds which are different from C) and have the formula (X)

$$M^3 (R^{38})_r (R^{39})_s (R^{40})_t \qquad (X)$$

where

M^3 is an alkali metal, an alkaline earth metal or a metal of main group III of the Periodic Table, i.e. boron, aluminum, gallium, indium or thallium,

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r is an integer from 1 to 3

and

s and t are integers from 0 to 2, where the sum r+s+t corresponds to the

MARKED VERSION OF AMENDED CLAIMS - OZ 0050/50063

valence of M^3.

6. A process for preparing supported catalysts as claimed in claim 1 [any of claims 1 to 5], which comprises preparing copolymers comprising the monomer units I, II and III in solution or dissolving the copolymers in a suitable solvent after they have been prepared and adding the metallocene complex B) and the compound C) capable of forming metallocenium ions to this solution.

8. A process for preparing supported catalysts as claimed in claim 6 [or 7], wherein the copolymer A) is pretreated with compounds of the formula (X) prior to the addition of metallocene complex B) and compound C) capable of forming metallocenium ions.

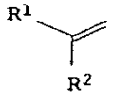
10. A process for the polymerization of olefins in the presence of a supported catalyst as claimed in claim 1 [any of claims 1 to 5].

CLAIMS AS FILED - OZ 0050/50063

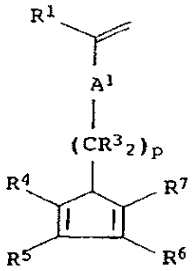
1. A supported catalyst for olefin polymerization comprising

A) as support material, a copolymer comprising at least the monomer units I, II and III,

where the monomer units I have the formula (I) and the monomer units II have the formula (II),



(I)



(II)

where the variables have the following meanings:

R^1 is hydrogen, C_1-C_4-alkyl or phenyl,

R^2 is substituted or unsubstituted aryl or branched or unbranched alkyl or alkenyl,

A^1 is directed chemical bond or a substituted or unsubstituted phenylene group,

R^3 are identical or different and are each hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl,

p is an integer from 0 to 8, and

R^4 to R^7 are hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl

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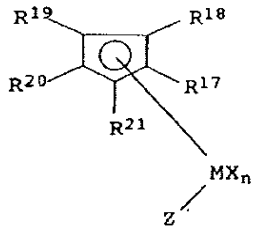
and the monomer units III have polar groups,

and

B) at least one metallocene complex of the formula (V)



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where the substituents and indices have the following meanings:

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X is fluorine, chlorine, bromine, iodine, hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical, $-OR^{22}$ or $-NR^{22}R^{23}$,

n is 1, 2 or 3, where n corresponds to the valence of M minus 2,

where

R^{22} and R^{23} are C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl, arylalkyl, fluoroalkyl or fluoroaryl, each having from 1 to 10 carbon atoms in the alkyl radical and from 6 to

CLAIMS AS FILED - OZ 0050/50063

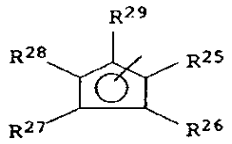
20 carbon atoms in the aryl radical and

the radicals X are identical or different,

R^{17} to R^{21} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, where two adjacent radicals may together form a saturated or unsaturated cyclic group having from 4 to 15 carbon atoms, or $Si(R^{24})_3$ where

R^{24} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl or C_6-C_{15}-aryl and

z is as defined for X or is



where the radicals

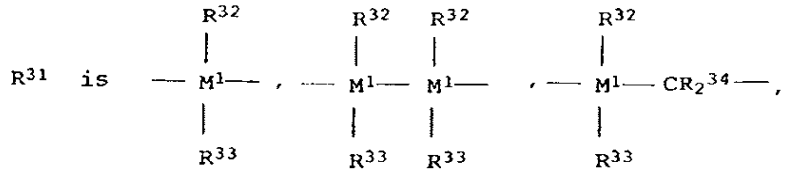
R^{25} to R^{29} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, where two adjacent radicals may together form a saturated or unsaturated cyclic group having from 4 to 15 carbon atoms, or $Si(R^{30})_3$ where

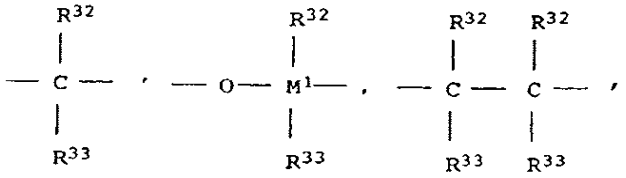
R^{30} is C_1-C_{10}-alkyl, C_3-C_{10}-cycloalkyl or C_6-C_{15}-aryl,

or the radical R^{20} and Z together form an -R^{31}-A-group where

CLAIMS AS FILED - OZ 0050/50063

R^{31} is





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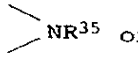
$= SO_2$, $= NR^{32}$, = CO, $= PR^{32}$ or $= P(O)R^{32}$,

where

R^{32}, R^{33} and R^{34} are identical or different and are each a hydrogen atom, a halogen atom, a C_1-C_{10}-alkyl group, a C_1-C_{10}-fluoroalkyl group, a C_6-C_{10}-fluoroaryl group, a C_6-C_{10}-aryl group, a C_1-C_{10}-alkoxy group, a C_2-C_{10}-alkenyl group, a C_7-C_{40}-arylalkyl group, a C_8-C_{40}-arylalkenyl group, or a C_7-C_{40}-alkylaryl group or two adjacent radicals together with the atoms connecting them form a saturated or unsaturated ring having from 4 to 15 carbon atoms, and

M^1 is silicon, germanium or tin,

A is —O—, —S—,  or ,

where

R^{35} is C_1-C_{10}-alkyl, C_6-C_{15}-aryl, C_3-C_{10}-cycloalkyl, C_7-C_{18}-alkylaryl or

CLAIMS AS FILED - OZ 0050/50063

$Si(R^{36})_3$, where

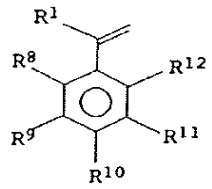
R^{36} is hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl which may in turn bear C_1-C_4-alkyl groups as substituents or C_3-C_{10}-cycloalkyl,

or the radicals R^{20} and R^{28} together from an -R^{31}-group

and

C) is at least one compound capable of forming metallocenium ions.

2. A supported catalyst as claimed in claim 1, wherein the monomer units III are compounds of the formula (IIIa),

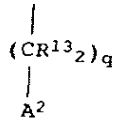


(IIIa)

where

R^8 to R^{12} are hydrogen, C_1-C_{10}-alkyl, 5- to 7-membered cycloalkyl which may in turn bear C_1-C_{10}-alkyl groups as substituents, C_6-C_{15}-aryl or arylalkyl, or the radicals may together with adjacent radicals in each case form a saturated or unsaturated ring having from 5 to 15 carbon atoms,

but at least one radical R^8 to R^{12} is a group of the formula (IV),



IV

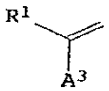
where

R^{13} are identical or different and are each hydrogen, C_1-C_{10}-alkyl or substituted or unsubstituted phenyl,

q is an integer from 0 to 8 and

A^2 is a group OR^{14}, $NR^{14}R^{15}$, $PR^{14}R^{15}$, CN, $COOR^{14}$ or $(O-(CH_2)_{q'})_{q''}-OR^{14}$ where R^{14} and R^{15} are identical or different and are each hydrogen or C_1-C_4-alkyl and q' is an integer from 1 to 5 and q'' is an integer from 1 to 8,

or the monomer units III are compounds of the formula (IIIB),



(IIIb)

where

A^3 is $COOR^{16}$ or CN, where

R^{16} is hydrogen or C_1-C_{10}-alkyl.

3. A supported catalyst as claimed in claim 1, wherein the copolymer A) is crosslinked via the monomer units II.

4. A supported catalyst as claimed in claim 1 which further comprises, as additional component D), one or more metal compounds which are different from C) and have the formula (X)

$$M^3 (R^{38})_r (R^{39})_s (R^{40})_t \qquad (X)$$

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where

M^3 is an alkali metal, an alkaline earth metal or a metal of main group III of the Periodic Table, i.e. boron, aluminum, gallium, indium or thallium,

R^{38} is hydrogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl or arylalkyl or alkoxy each having from 1 to 10 carbon atoms in the alkyl radical and from 6 to 20 carbon atoms in the aryl radical,

R^{39} and R^{40} are hydrogen, halogen, C_1-C_{10}-alkyl, C_6-C_{15}-aryl, alkylaryl, arylalkyl or alkoxy each having from 1 to 10 carbon atoms in the alkyl part and from 6 to 20 carbon atoms in the aryl part,

r is an integer from 1 to 3

and

s and t are integers from 0 to 2, where the sum r+s+t corresponds to the valence of M^3.

5. A supported catalyst as claimed in claim 4, wherein the copolymer A) serving as support material has been pretreated with compounds of the formula (X) prior to application of metallocene complex B) and compound C) capable of forming metallocenium ions.

6. A process for preparing supported catalysts as claimed in claim 1, which comprises preparing copolymers comprising the monomer units I, II and III in solution or dissolving the copolymers in a suitable solvent after they have been prepared and adding the metallocene complex B) and the compound C) capable

of forming metallocenium ions to this solution.

7. A process for preparing supported catalysts as claimed in claim 6, wherein the polymer A) is crosslinked at from 0 to 150°C by means of a Diels-Alder reaction either before or after the addition of metallocene complex B) and compound C) capable of forming metallocenium ions.

8. A process for preparing supported catalysts as claimed in claim 6, wherein the copolymer A) is pretreated with compounds of the formula (X) prior to the addition of metallocene complex B) and compound C) capable of forming metallocenium ions.

9. A copolymer which comprises the monomer units I, II and IIIa and is suitable as support material for catalysts for the polymerization of olefins.

10. A process for the polymerization of olefins in the presence of a supported catalyst as claimed in claim 1.